

**REMARKS**

Claims 1, 2, 5-23, 25 and 26 are all of the claims presently pending in the application. The claims have not been amended by the present Request for Reconsideration.

Claims 1, 2, 5-23, 25 and 26 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement and failing to comply with the enablement requirement. Claim 13 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Claims 1-2, 5-11, 13-15, 17, 19, and 22-26 stand rejected under 35 U.S.C. §102(b) as being anticipated by Kamata et al. (U.S. Pub. No. 2002-0142192; hereinafter “Kamata”). Claim 12 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Kamata in view of Ning et al. (U.S. Pub. No. 2002-0098676; hereinafter Ning). Claim 16 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Kamata in view of Baglin et al. (U.S. Pat. No. 6,331,364; hereinafter “Baglin”). Claim 18 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Kamata. Claims 20-21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kamata in view of Chen et al. (U.S. Pat. No. 6,165,803; hereinafter “Chen”).

These rejections are respectfully traversed in the following discussion.

**I. THE CLAIMED INVENTION**

The claimed invention of exemplary claim 1 is directed to a method of patterning a magnetic thin film. The method includes transforming a portion of the magnetic thin film to be non-magnetic and electrically insulating using a chemical transformation.

wherein the reactive plasma includes O<sub>2</sub> and a fluorine-containing gas.

## **II. THE WRITTEN DESCRIPTION REQUIREMENT REJECTION**

The Examiner has rejected claims 1, 2, 5-23, 25 and 26 for allegedly failing to comply with the written description requirement. Specifically, the Examiner alleges that the Specification does not provide support for the claim limitation “wherein said reactive plasma includes O<sub>2</sub> and a fluorine-containing gas” (see Office Action dated January 3, 2007 at page 3). The Examiner, however, is clearly incorrect.

Applicants point out that the written description requirement is satisfied if the claimed invention is described in any section of the application. That is, the invention may be disclosed in the specification, the drawings or the originally filed claims (see M.P.E.P. §2163).

Applicants point out that the limitation “wherein said reactive plasma includes O<sub>2</sub> and a fluorine-containing gas”, which is currently recited in independent claim 1, was recited in original claim 24. Therefore, the above limitation was clearly described in the original Specification.

The Examiner alleges that in “cancelled claim 24, the two gases “O<sub>2</sub> and a fluorine-containing gas” are in a Markush group. The Examiner’s allegation, however, is clearly without merit.

The Examiner is urged to review the original claim 24, which clearly recites “The method of claim 3, wherein said reactive plasma includes O<sub>2</sub> and a fluorine-containing gas”. The language of claim 24 clearly does not recite a Markush claim and clearly recites that the plasma includes O<sub>2</sub> **and** a fluorine-containing gas.

The Examiner is further urged to review M.P.E.P. §2173.05(h), which discusses the use of Markush group language for reciting alternative limitations. Specifically, M.P.E.P. §2173.05(h) very clearly sets forth that a Markush group recites “members as being “selected from the group consisting of A, B, and C”””. This language is not present in originally filed claim 24, which does not recite an alternative limitation.

Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

### **III. THE ENABLEMENT REQUIREMENT REJECTION**

The Examiner has rejected claims 1, 2, 5-23, 25 and 26 for allegedly failing to comply with the enablement requirement. Specifically, the Examiner alleges that the Specification does not provide an enabling disclosure for the claim limitation “wherein said reactive plasma includes O<sub>2</sub> and a fluorine-containing gas” (see Office Action dated January 3, 2007 at page 3).

Specifically, the Examiner alleges that “the specification fails to enable one skilled in the art to make the invention, since only fluorine-containing gas is shown” (see Office Action dated January 3, 2007 at page 4; emphasis added by Applicants). The Examiner, however, is clearly incorrect.

Indeed, as detailed in section II, above, the Specification clearly provides support for the limitation of “wherein said reactive plasma includes O<sub>2</sub> and a fluorine-containing gas”.

Furthermore, Applicants point out that the enablement requirement has been interpreted as whether one reasonably skilled in the art could make and use the invention

from the disclosure in the specification coupled with information known in the art without undue experimentation. The fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation.

Applicants submit that one of ordinary skill in the art could make and use the invention from the originally filed disclosure (e.g., see M.P.E.P. at 2164).

Moreover, Applicants point out the initial burden is on the examiner to establish a reasonable basis for questioning the adequacy for the disclosure to make and use the claimed invention without resorting to undue experimentation. The Examiner, however, has clearly failed to meet this burden (e.g., see M.P.E.P. at 2164.04).

Indeed, the Examiner, as indicated above, has merely alleged that “the specification fails to enable one skilled in the art to make the invention, since only fluorine-containing gas is shown” (see Office Action dated January 3, 2007 at page 4; emphasis added by Applicants). However, as previously pointed out by the Applicants, this allegation is incorrect.

Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

#### **IV. THE INDEFINITENESS REJECTION**

Claim 13 stands rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite.

Applicants submit that the Examiner is clearly incorrect.

The Examiner inquires “[w]hat is the difference between the magnetic device produced by claim 1 and that of claim 13?” (see Office Action dated January 3, 2007 at page 4).

Applicants have **repeatedly** pointed out that claim 1 does not recite “producing a magnetic device”. Indeed, claim 1 clearly recites “a method of patterning a magnetic thin film”. Claim 1 does not produce a magnetic device. Claim 13, however, recites the additional method step of forming a magnetic device.

Applicants submit that the Specification and Drawings of the Application clearly point out the difference between a magnetic thin film and a magnetic device, as recited in the claims.

Specifically, the Application describes in detail the process of transforming a portion of the magnetic thin film using a reactive plasma (e.g., see Application at page 7, line 3 through page 8, line 14). The Application further describes, in detail, that “[s]ubsequent processing can proceed in a known manner (e.g., as typically performed) to produce a functioning magnetic device. An example of such a structure is shown in Figures 2A-2C” (e.g., see Application at page 8, lines 21-23).

Figures 2A-2C, and the corresponding description in the Specification at page 9, line 1 through page 10, line 5, illustrates, in detail, a structure (magnetic device) (e.g., 200; Applicants submit that reference numbers are merely provided for the convenience of the Examiner and are not meant to limit the scope of the claimed invention in any manner) having a substrate (e.g., 210) having a magnetic thin film.

Furthermore, Figure 3, and the corresponding description in the Specification at page 10, lines 6-18, illustrates a flowchart of a method that corresponds to the processing

steps shown in Figures 2A-2C. Specifically, the exemplary method illustrated in Figure 3 includes forming a magnetic thin film on a substrate (e.g., 310), exposing the thin film to a reactive plasma (e.g., 330) and then forming a functioning magnetic device (e.g., 340).

Thus, one of ordinary skill in the art, in view of the detailed description in both the Specification and the Drawings of the Application, would clearly understand the difference between the magnetic thin film of claim 1 and the magnetic device of claim 13.

Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

## **V. THE PRIOR ART BASED REJECTIONS**

### **A. The Kamata Reference**

Claims 1, 2, 5-11, 13-15, 17, 19 and 22-26 stand rejected under 35 U.S.C. 102(b) as being anticipated by Kamata. Additionally, claim 18 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Kamata. Applicants submit, however, that there are features of the claimed invention that are not taught or suggested by Kamata.

That is, Kamata does not teach or suggest “*wherein said reactive plasma includes O<sub>2</sub> and a fluorine-containing gas*”, as recited in exemplary claim 1.

The Examiner alleges that “Kamata clearly teaches the magnetic thin film being exposed to reactive plasma includes fluorine-containing gas and oxygen gas. (See at least [0070] and [0181])” (see Office Action dated January 3, 2007 at page 11). The Examiner, however, is clearly incorrect.

That is, paragraphs [0070] and [0181] of Kamata do not provide support for the Examiner's allegations. Indeed, [0070] of Kamata merely states that "[f]or the removal of the resist, ashing process using oxygen plasma can be employed". Furthermore, paragraph [0181] of Kamata merely states that "[a] surface layer is exposed in active reaction gas containing halogen gas such as fluorine radicals under conditions similar to those of the first embodiment. Then, the remaining resist is removed by oxygen ashing".

Kamata does not teach or suggest a plasma that includes both O<sub>2</sub> and a fluorine-containing gas. That is, Kamata teaches separate steps of using a halogen-containing plasma and oxygen ashing.

Therefore, Applicants submit that there are features of the claimed invention that are not taught or suggested by Kamata. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

#### **B. The Ning Reference**

The Examiner alleges that Ning would have been combined with Kamata to teach the claimed invention of claim 12. Applicants submit, however, that these references would not have been combined as alleged by the Examiner and that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention.

That is, as detailed in section A, above, Kamata does not teach or suggest "*wherein said reactive plasma includes O<sub>2</sub> and a fluorine-containing gas*", as recited in exemplary claim 1.

Furthermore, Applicants submit that Ning fails to make up the deficiencies of Kamata. Indeed, the Examiner does not even allege that Ning teaches or suggests transforming a portion of the magnetic thin film to be non-magnetic and electrically insulating using a chemical transformation. Indeed, the Examiner merely relies upon Ning as teaching providing a mask for patterning.

That is, the Examiner alleges that “Ning teaches utilizing photolithography to provide a mask including TaN, TiN (244) for patterning” (see Office Action dated August 3, 2006 at page 6). The Examiner, however, has not provided a motivation or suggestion to combine this feature of Ning with Kamata.

Applicants submit “[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.” (§ 2143, Emphasis added).

The Examiner has not provided a motivation or suggestion to combine the teachings of the prior art references. That is, the Examiner merely alleges “it would have been obvious to one having ordinary skill in the art at the time of invention to provide a hard mask of Kamata including a TiN and TaN as taught by Ning for patterning over the portion of the magnetic thin film” (see Office Action dated January 3, 2007 at page 8).

The Examiner fails to recognize that there mere disclosure of features in applied references is *prima facie* insufficient to maintain an obviousness rejection. Rather, the Examiner appears to ignore and, indeed, has failed to provide any teaching, suggestion or motivation for making the alleged modification.

*"The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination"* (emphasis in MPEP itself).

Along these lines, Judge Rader wrote in the recent Federal Circuit Court of Appeals holding in *Ruiz v. A.B. Chance Co.*, Federal Cir., No. 03-1333, January 29, 2004:

*"In making the assessment of differences, section 103 specifically requires consideration of the claimed invention "as a whole." Inventions typically are new combinations of existing principles or features. Envtl. Designs, Ltd. v. Union Oil Co., 713 F.2d 693, 698 (Fed. Cir. 1983) (noting that "virtually all [inventions] are combinations of old elements."). The "as a whole" instruction in title 35 prevents evaluation of the invention part by part. Without this important requirement, an obviousness assessment might break an invention into its component parts (A + B + C), then find a prior art reference containing A, another containing B, and another containing C, and on that basis alone declare the invention obvious. This form of hindsight reasoning, using the invention as a roadmap to find its prior art components, would discount the value of combining various existing features or principles in a new way to achieve a new result - often the very definition of invention."*

Although the holding in that case left undisturbed, under the "clear error" standard of review, the conclusion of the District Court that the prior art references were properly combinable, it specifically explained that it declined to reverse this conclusion because "... the two references address precisely the same problem ... " (emphasis by Applicants)

This aspect of the *Ruiz* holding, in which precisely the same problem is being addressed by both references, is not present in Ning and Kamata, used in the prior art evaluation of the present Application.

Therefore, the Examiner has clearly failed to establish a *prima facie* case of obviousness.

Thus, Ning fails to make up the deficiencies of Kamata.

Therefore, Applicants submit that these references would not have been combined as alleged by the Examiner and that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

### **C. The Baglin Reference**

The Examiner alleges Baglin would have been combined with Kamata to teach the claimed invention of claim 16. Applicants submit, however, that these references would not have been combined as alleged by the Examiner and that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention.

That is, as detailed in section A, above, Kamata does not teach or suggest “*wherein said reactive plasma includes O<sub>2</sub> and a fluorine-containing gas*”, as recited in exemplary claim 1.

Furthermore, Applicants submit that Baglin fails to make up the deficiencies of Kamata. Indeed, the Examiner does not even allege that Baglin teaches or suggests transforming a portion of the magnetic thin film to be non-magnetic and electrically insulating using a chemical transformation. Indeed, the Examiner merely relies upon Baglin as teaching other ion species that may be used for converting a magnetic thin film including argon.

Applicants submit “[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.” (§ 2143,Emphasis added).

The Examiner has not provided a motivation or suggestion to combine the teachings of the prior art references. That is, the Examiner merely alleges “it would have been obvious to one having ordinary skill in the art at the time of invention was made to convert a portion of the magnetic thin film of Kamata utilizing argon plasma as taught by Baglin to achieve the desired chemical conversion ” (see Office Action dated January 3, 2007 at page 8).

The Examiner fails to recognize that there mere disclosure of features in applied references is *prima facie* insufficient to maintain an obviousness rejection. Rather, the Examiner appears to ignore and, indeed, has failed to provide any teaching, suggestion or motivation for making the alleged modification.

Therefore, the Examiner has clearly failed to establish a *prima facie* case of obviousness.

Thus, Baglin fails to make up the deficiencies of Kamata.

Therefore, Applicants submit that these references would not have been combined as alleged by the Examiner and that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

**D. The Chen Reference**

The Examiner alleges that Chen would have been combined with Kamata to teach the claimed invention of claims 20 and 21. Applicants submit, however, that these references would not have been combined as alleged by the Examiner and that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention.

That is, as detailed in section A, above, Kamata does not teach or suggest “*wherein said reactive plasma includes O<sub>2</sub> and a fluorine-containing gas*”, as recited in exemplary claim 1.

Furthermore, Applicants submit that Chen fails to make up the deficiencies of Kamata. Indeed, the Examiner does not even allege that Baglin teaches or suggests transforming a portion of the magnetic thin film to be non-magnetic and electrically insulating using a chemical transformation. Indeed, the Examiner merely relies upon Chen as teaching further process steps.

Applicants submit “[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.” (§ 2143, Emphasis added).

The Examiner has not provided a motivation or suggestion to combine the teachings of the prior art references. That is, the Examiner merely alleges “it would have been obvious to one having ordinary skill in the art at the time of invention was made to further process the converted magnetic thin film of Kamata utilizing the further process

step as taught by Chen to form the MTJ device ” (see Office Action dated January 3, 2007 at page 9).

The Examiner fails to recognize that there mere disclosure of features in applied references is *prima facie* insufficient to maintain an obviousness rejection. Rather, the Examiner appears to ignore and, indeed, has failed to provide any teaching, suggestion or motivation for making the alleged modification.

Therefore, the Examiner has clearly failed to establish a *prima facie* case of obviousness.

Thus, Chen fails to make up the deficiencies of Kamata.

Therefore, Applicants submit that these references would not have been combined as alleged by the Examiner and that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

## **VI. EXAMINER’S RESPONSE TO ARGUMENTS**

In the Examiner’s Response to Arguments (see Office Action dated January 3, 2007 at page 11) the Examiner erroneously alleges that “[s]ince Kamata teaches all limitations of claim 1, then the combination of Kamata and Ning, ‘676, or Baglin ‘364, or Chen ‘803 clearly renders claims 12, 16, 18, 20 and 21 obvious”. This reasoning by the Examiner, however, is clearly without merit.

That is, with respect to the Examiner's rejections under 35 U.S.C. §103, Applicants have provided detailed traversal arguments pointing out how the Examiner has failed to establish a *prima facie* rejection of claims 12, 16, 20 and 21.

The Examiner's above reasoning clearly ignores Applicants' traversal arguments as well as the standards set forth in the M.P.E.P. for determining obviousness. That is, whether the Examiner has established a proper anticipation rejection of claims 1, 2, 5-11, 13-15, 17, 19 and 22-26 has no bearing on whether the Examiner has established a *prima facie* case of obviousness with respect to claims 12, 16, 20 and 21.

Indeed, Applicants have submitted that the Examiner has failed to established a *prima facie* case of obviousness because the Examiner has failed to provide a motivation or suggestion for combining the applied references. The Examiner, however, has not responded to Applicants traversal arguments. Accordingly, Applicants assume that the Examiner concedes that he has not provided a motivation for combining the applied references.

If the Examiner wishes to maintain these rejections, Applicants request the Examiner to respond to each of Applicants traversal arguments with respect to each of the current rejections.

## **VII. FORMAL MATTERS AND CONCLUSION**

Regarding the Examiner's objection to claim 13, as being of improper dependent form, the Examiner is clearly incorrect. ". Indeed, claim 1 clearly recites "a method of patterning a magnetic thin film". Claim 13 further limits the subject matter of claim 1 by claiming the additional step of producing a magnetic device after the limitation of

“transforming a portion of the magnetic thin film to be non-magnetic and electrically insulating using a chemical formation”. A person reasonably skilled in the art would clearly understand what is meant by the phrase “producing a magnetic device” and that “producing a magnetic device” is clearly different from “transforming a portion of the magnetic thin film to be non-magnetic and electrically insulating using a chemical formation”. Therefore, claim 13 clearly further limits the subject matter of claim 1 and therefore is clearly in proper dependent form.

The Examiner erroneously alleges that “Applicant still fails to distinguish the magnetic film formed by claim 1 and the so called magnetic “device” of claim 13” (see Office Action dated January 3, 2007 at page 2). The Examiner, however, is clearly incorrect.

That is, Applicants have repeatedly pointed out that claim 1 does not recite “producing a magnetic device”. Indeed, claim 1 clearly recites “a method of patterning a magnetic thin film”. Claim 1 does not produce a magnetic device. Claim 13, however, recites the additional method step of forming a magnetic device.

Applicants submit that the Specification and Drawings of the Application clearly point out the difference between a magnetic thin film and a magnetic device, as recited in the claims.

Specifically, the Application describes in detail the process of transforming a portion of the magnetic thin film using a reactive plasma (e.g., see Application at page 7, line 3 through page 8, line 14). The Application further describes, in detail, that “[s]ubsequent processing can proceed in a known manner (e.g., as typically performed) to

produce a functioning magnetic device. An example of such a structure is shown in Figures 2A-2C” (e.g., see Application at page 8, lines 21-23).

Figures 2A-2C, and the corresponding description in the Specification at page 9, line 1 through page 10, line 5, illustrates, in detail, a structure (magnetic device) (e.g., 200; Applicants submit that reference numbers are merely provided for the convenience of the Examiner and are not meant to limit the scope of the claimed invention in any manner) having a substrate (e.g., 210) having a magnetic thin film.

Furthermore, Figure 3, and the corresponding description in the Specification at page 10, lines 6-18, illustrates a flowchart of a method that corresponds to the processing steps shown in Figures 2A-2C. Specifically, the exemplary method illustrated in Figure 3 includes forming a magnetic thin film on a substrate (e.g., 310), exposing the thin film to a reactive plasma (e.g., 330) and then forming a functioning magnetic device (e.g., 340).

Thus, one of ordinary skill in the art, in view of the detailed description in both the Specification and the Drawings of the Application, would clearly understand the difference between the magnetic thin film of claim 1 and the magnetic device of claim 13.

In view of the foregoing, Applicants submit that claims 1, 2, 5-23, 25 and 26, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone

number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Respectfully Submitted,

Date: January 30, 2007



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